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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,405	10/22/2003	Daniel F. Pratt	PA0511DGA03	8499
25691	7590	05/25/2005	EXAMINER	
SEH AMERICA, INC. M/S 58-1-921 4111 N.E. 112TH AVE. VANCOUVER, WA 98682			SONG, MATTHEW J	
			ART UNIT	PAPER NUMBER
			1722	

DATE MAILED: 05/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/692,405

Applicant(s)

PRATT, DANIEL F.

Examiner

Matthew J. Song

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/22/03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 6-21, 23-33 and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takanashi et al (US 2002/0029738 A1) in view of Higo (JP 06-183874), an English abstract and computer translation (CT) have been provided.

In an apparatus for Czochralski crystal growth, note entire reference, Takanashi et al discloses a bottom chamber (Fig 1); a crucible **21** within the bottom chamber, which is rotatable and containing a molten material **23** ([0005]); a top chamber above the bottom chamber (Fig 1); a winding drum **5** mounted on the top chamber; a flexible member **24** wound around the drum **11** (Fig 1 and [0005]-[0006]); and a one dimensional CCD camera connected to a diameter measuring means ([0006]), this reads on applicant's sensor. Takanashi also discloses an inert gas is introduced into the apparatus body ([0008]).

Takanashi et al does not disclose at least one flow nozzle for directing a purge gas onto at least one of the flexible member and the crystal.

In an apparatus for Czochralski crystal growth, note entire reference, Higo teaches a circular gas blowing pipe surrounding the lower part of a silicon single crystal and gas blowing holes are disposed for blowing out an inert gas. Higo also teaches controlled blowing of gas

Art Unit: 1722

permits control of the vaporization amount of silicon dioxide from the melted liquid and makes the oxygen concentration of the single crystal uniform (Abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Takanashi et al by using the inert gas blowing apparatus taught by Higo to control the vaporization amount of silicon dioxide to make the oxygen concentration of silicon single crystal uniform.

Referring to claims 2-3, 21 and 33, the combination of Takanashi et al and Higo teaches a CCD camera ('738 [0006]).

Referring to claims 6-7 and 36-37, the combination of Takanashi et al and Higo teaches a wire ('738 [0005]), this reads on applicant's cable.

Referring to claims 8-10, 15, 18-20, 27 and 30-32, the combination of Takanashi et al and Higo teaches the nozzle 9 directs the inert gas at a plurality of angles. The combination of Takanashi et al and Higo does not teach the claimed intended use of claims 8-10, 15 and 18-20. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963). The nozzles are capable of directing gas at different angles; therefore meet the claimed limitation.

Referring to claim 11, the combination of Takanashi et al and Higo teaches a CCD camera to measure the diameter of the crystal, this reads on applicant's diameter measurement system to measure the diameter of the crystal and to detect orbit, note claim 21.

Art Unit: 1722

Referring to claims 12-13 and 24-25, the combination of Takanashi et al and Higo teaches a gas supply line connected to a control unit (CT [0010]) and adjusting the flow rate of the inert gas introduced into the blow gas tubing through the supply line to change the flow rate through the holes (CT [0014]), this reads on applicant's controller for controlling the flow of the purge gas to the at least one flow nozzle.

Referring to claims 14 and 26, the combination of Takanashi et al and Higo teaches controlling the flow rate of inert gas. The combination of Takanashi et al and Higo does not teach a control valve to open and close flow the purge gas. Control valves are well known in the art to be used to control flow rate of gases. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Takanashi et al and Higo by using a control valve to control flow rate because it is a conventionally known means for controlling flow rate.

Referring to claims 16 and 28, the combination of Takanashi et al and Higo teaches the flow nozzles radially surround the crystal ('874 Fig 2).

Referring to claims 17 and 29, the combination of Takanashi et al and Higo teaches two or more blow gas holes which can be adjusted within a vertical plane (CT [0005]), this reads on applicant's nozzles are spaced vertically in the pulling machine.

Referring to claim 23, the combination of Takanashi et al and Higo teaches a CCD camera, this reads on applicant's sensor to detect orbital motion, note claim 33.

3. Claims 4, 22 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takanashi et al (US 2002/0029738 A1) in view of Higo (JP 06-183874), an English abstract and

Art Unit: 1722

computer translation (CT) have been provided, as applied to claims 1-3, 6-21, 23-33 and 36-37 above, and further in view of IBM ("Monitoring Diameter Variation and Diameter control using laser beam and image processing in Czochralski Crystal Growth").

The combination of Takanashi et al and Higo teaches all of the limitations of claims 4, 22 and 34, as discussed previously, except a laser being used.

In a method for Czochralski crystal growth, note entire reference, IBM teaches a laser beam is used to achieve precise diameter control in near real-time (Disclosure). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Takanashi et al and Higo by using a laser beam for diameter control, as taught by IBM, to provide precise near real-time diameter control.

4. Claims 5 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takanashi et al (US 2002/0029738 A1) in view of Higo (JP 06-183874), an English abstract and computer translation (CT) have been provided, as applied to claims 1-3, 6-21, 23-33 and 36-37 above, and further in view of Korb et al (US 5,582,642).

The combination of Takanashi et al and Higo teaches all of the limitations of claims 5 and 35, as discussed previously, except a proximity sensor.

In an apparatus for Czochralski crystal growth, note entire reference, Korb et al teaches a Czochralski apparatus equipped with at least one position sensor, this reads on applicant's proximity sensor, to sense the position of a pull wire (col 2, ln 1-55 and col 5, ln 1-67). Korb et al also teaches the apparatus reduces pendular motion of a pull wire during growth and pendular motions may reduce the quality of produced crystals (col 1, ln 1-67). It would have been obvious

Art Unit: 1722

to a person of ordinary skill in the art at the time of the invention to modify the combination of Takanashi et al and Higo by using the sensor taught by Korb et al to reduce pendular motion, thereby improve the quality of crystals.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fusegawa et al (US 5,725,661) discloses a bottom chamber 5 and a crucible within the bottom chamber 2; a top chamber 11 above the bottom chamber; a wire winding; a wire 12; a monitoring camera 7 of a charge-coupled device (CCD) type (Fig 1 and col 3, ln 20-35) and a port for supply of an inert gas (col 3, ln 35-50), this reads on applicant's at least one flow nozzle for directing a purge gas onto at least one of the flexible member and the crystal.

Katsuoka et al (US 5,584,930) teaches a top chamber 8, a bottom chamber 2, a wire 12, an image sensor 17, a drum 11 and an inert gas is supplied to the chamber (col 4, ln 1-67).

Boulaev (US 5,746,828) teaches a crucible, a seed cable, an optical sensor and an inert gas is circulated between an entry port and an exit port (col 4, ln 1-67).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

Art Unit: 1722

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 571-272-1137. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song  
Examiner  
Art Unit 1722

MJS  
May 12, 2005



**ROBERT KUNEMUND  
PRIMARY EXAMINER**